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Revolutionizing Education Harnessing Technology For Efficient School Management

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Abstract

Technological innovations are slowly finding their way to schools as a means of enhancing the management of schools and improving the school environment. The adoption of technology in schools today aims at using technological solutions that may include cloud-based storage .The use of an LMS, artificial intelligence, and data analytics in streamlining daily administration activities that employees perform manually. The use of other technology-enabled tools known as digital solutions to enhance the collaborative ecosystem of schools. Technologization understands cultural transformation as a move towards increasing rationalization for the sake

of students, educators, and administrators' sides. The writer specifically looks at the effects of management solutions facilitated by technology on the efficiency of schools. The various types of technologies used and their efficiency levels, and the kinds of challenges that institutions of learning encounter in embracing the use of technology. This research uses both quantitative and qualitative research to investigate the topic of technological implementation in school administration. Online Survey and Telephone questionnaires are given to 50 schools where management systems incorporated technology, and participants included school administrators, teachers, and IT personnel. The survey compares the efficiency of the software in terms of perceived effectiveness, ease of use, cost, and difficulty in using the software. Questionnaires are administered together with interviews aiming at gaining in-depth and comprehensive data arising from the experiences of the various stakeholders. The results of this study have revealed that technology play an important role in changing the management roles of schools through increasing efficiency in accessing and entering data while at the same time increasing efficiency in collaboration. There are factors like costs, the technical nature of the system, and organizational resistance that may hamper complete adoption.

Keywords: School management, Educational technology , Digital transformation in education, Learning management systems, Technology integration, Data-driven decision-making, Educational innovation, Technological challenges in education

Introduction:

Education systems across the globe are experiencing massive changes due to technology, which has the capacity to enhance school functionality, operations, and educational processes in general Makinde, A. I., Adeleye, S. A., (2024). Incorporation of technology in schools can help in organization effectiveness, resulting in improved resource utilization, communication, and even decision-making. Solutions like cloud computing, artificial intelligence, and data analytics make it possible for educational institutions to manage administrative loads more efficiently, and in doing so, they relieve educators to give more time and attention to the core business of teaching and learning Ngmenkpieo, F., Tseer, (2023).Therefore, the incorporation of technology in the management of schools is not only efficient in the flow of operations but also helps schools manage the need to accommodate the development and implementation of personalized as well as inclusive education Ahmad, E. A. (2024). Technology eliminates time-consuming repetitive tasks, allows immediate access to data to enhance teamwork among teachers, students, and parents, and facilitates an open and effective channel between them Tariq, R., (2024). the use of informational resources solves issues like record keeping, monitoring students' performance, and managing infrastructure and equipment, which will help the institution save money on its functioning Onesi-Ozigagun, O., Ololade, Y. J.,. (2024). today's complex societies, schools have to learn quickly and transform using technology as a tool for efficient management to address the growing complexity of needs of the users and therefore revolutionize education delivery for the 21st century learners.

Importance of Technological Solutions in Schools:

Technologies in education is very important in order to improve the effectiveness, availability,

and quality of education in schools. Technology aids in organizational processes in several aspects that include administration, allocation of resources, and school ethos and environment communication system as postulated by Wang,.(2003).Cloud-based systems, data analytics, and artificial intelligence leadership in the schools can make the best decisions, which would benefit productivity and educational achievements Johnson, A. M., Jacovina, M. E., Russell, D. G., & Soto, C. M. (2016).Technology facilitates assessment and differentiation and enables the adaptation of instruction delivery contents regarding the students' requirements and achievements. The integrated approach here has more benefits than drawbacks when it comes to enhancing learners' participation and performance Ferdig, R. E. (2006). Virtual environments contribute to the daily interaction between the students, teachers, and parents, as well as the implementation of effective communication practices and the establishment of a strong educational culture Christensen, R., Eichhorn,.(2018). The use of technological solutions in the learning process introduces students to the digital society by training them in relevant skills, including computer skills, thinking skills, and other skills that make them ready for the various jobs Adada, N., Shatila, A., & Mneymneh, N. M. (2017).

Objective of the Study:

The primary objective of this study is to examine the impact of technological solutions on school management efficiency and educational quality.

- Analyze how technological tools can streamline administrative tasks and optimize resource management in educational institutions.
- Evaluate the role of digital platforms in enhancing communication and collaboration among students, teachers, and parents.
- Assess the effectiveness of technology in supporting personalized and inclusive learning environments that cater to diverse student needs.
- Investigate the potential of technology to prepare students with essential digital skills, improving their readiness for future academic and career opportunities.
- Identify the challenges and barriers schools face in implementing technological solutions and propose strategies to overcome these obstacles.

Literature Review

Education systems in schools are on the receiving end of technological evolutions, where the pace is quickly picking up in school management and in delivery of content. Research shows that while using information technology in schools and colleges enhances administrative routines, teamwork, and individualization of learning can be highly impactful for institutions, there are constraints in achieving such improvements Chang, I. H., Chin,(2008).This literature review studies technological solutions in the processes of school management, the uses of information technologies to enhance students' interest, and the challenges that schools experience while integrating technology into their setting.

Technological Innovations in School Management:

The development of technology has brought about many changes in school management and students' performance, enhancing the school management systems, analyzing data, and

responding to it appropriately. Technological tools like cloud-based systems, artificial intelligence, data and business analytics, and various digital communication solutions have become the standard for improving all the many different aspects of school administrative and management functions. By using cloud-based systems, school data has been made easy to store and be accessed by administrators, teachers, and even the staff. Data accessed with ease and at the same time be safe through record keeping of student records, attendance, and grades, among others, being in the cloud Schilling, M. A. (2017). These solutions foster the means of communication between educators and staff as well as offer means of sharing information within limited time without using conventional sources. This centralized approach again has an impact of increased efficiency in the organization and has a positive impact of the cost incurred for storage and other physical infrastructure Mustar, P. (2009). Artificial intelligence is being adopted in school management with the aim of resolving organizational tasks, thus making the teachers and the administration deal with educational responsibilities. For instance, AI tools can help in the management of time tables, attendance and marking systems, and numerous other issues related to school staff workload Shrivastava, P., & Souder, W. E. (1987). the data can be used by AI to examine the characteristics of performance that require teachers' attention in addressing the needs of the learners. Another application of AI is predictive analytics, for instance, providing schools with a way to make early decisions where human intervention is required on issues that affect the allocation of resources or students as the affected party. In today's management of a school, data analytics have been used to assist in coming up with a variety of insights that cover different operational and academic aspects of the school. Hence, through the processes of data accumulation and analysis, including student performance, attendance, and participation levels, schools come up with better solutions that will enhance education effectiveness Okon, O. E., & Essien, M. I. (2014). For example, using statistics, patterns in students' behavior may be identified and new support programs put in place. It enables schools to monitor the use of resources to enable better planning and budget control in their use. In the context of making decisions, a data-driven approach ensures that an educational institution is able to track and make adjustments to its efforts in real-time Mullakhmetov, K. S., Aminova,. (2019). Interaction among students, educators, and parents is crucial for the educational process to run smoothly. Integrated with modern tools including LMS, messaging apps, and parent portals, a regular, clear, and meaningful communication channel is established to keep all the stakeholders abreast and involved Avidov-Ungar, O. (2010).These platforms enable teachers to upload assignments, share documents, and give feedback about the assignment to the students, and parents, using their accounts, can track their child's progress and be in touch with school affairs. Positive interaction promotes high student achievement and parental participation because of the positive environment. Smartphone applications have proven to be of immense benefit in the management of schools as they offer an opportunity for real-time information to students, parents, and staff. There are so many applications that the users can easily access their grades, attendance, announcements, and the upcoming events through their mobile devices Shane, S. A., & Ulrich, K. T. (2004). These apps enhance participation and service delivery since the parents and students can be updated all the time. when in use Mobile apps help students by enabling them to access assignments and other learning materials, as this instills discipline among the students. Due to the fact that technology is making its way into our everyday lives, protecting data and information is important.

Advanced technologies, like encryption, two-factor authentication, and secure storage solutions, assist the schools to reduce risks associated with privacy Hsiao, H. C., Chen, S. C., Chang, J. C., (2009). Engineering education institutions are therefore integrating cybersecurity measures to meet the privacy requirements of students and staff and to assure stakeholders. The aforesaid security measures are invaluable for containing the threats that may disrupt safety and for enabling educational institutions to effectively use technology. Application of technology in school management yields tangible organizational advantages, such as saving time in organizational and communication activities. The school improve in its decision-making, and this will be brought about by technological inventions in the management system. Integrating cloud systems, artificial intelligence, analyses of data, additional digital platforms, and mobile applications helps to increase the tempo and quality of the interaction between schools. The implementation of the above innovations requires reliable measures of cyberspace protection for personalized information. Alias, N. A., & Zainuddin, A. M. (2005). While technology has become a critical component within the functioning of educational institutions, these tools will become ever more indispensable to the process of managing change in the future.

Benefits of Digital Solutions in Education:

Digital solutions have been integrated in education systems and have led to enhancement of the teaching, learning, and school processes. They improve work flow, support differentiation in instruction, address student participation, and cater for the digital age. Ogunode, N. J., & Ndayebom, A. J. (2023). The following are key benefits of digital solutions in education: Cloud-based applications and data management systems facilitate the administrative tasks that the educators and staff require to complete and are supplemented with records and attendance or grading systems, for example Василишина, Н. М. (2020). Outsourcing enables standard procedures that occupied a lot of the educators' time to be handled in a short time, hence enhancing productivity and, as an added advantage, reducing the operating cost of schools Parveen, D. S., & Ramzan, S. I. (2024).This efficiency helps school administrators to be connected to real-time information, which enhances integral thought processes in resource management. Another effect of digital solutions is that many of them make it easy to teach individual lessons that can be a part of the course and tailored to fit one student. According to A bed, E. K. (2019). adaptive learning technologies like artificial intelligence tutor systems check the learner's proficiency, and the difficulty of the content delivered is adjusted according to the learning style. Research indicates a planned learning environment benefits students to reinforce students with learning disabilities, low achievers, or a students' unique learning style. The emphases on individual learning improve academic achievement since the child learns at his or her own sweet rate while being motivated by the supportive learning environment offered by the teachers. Information technology, in particular concepts such as hybrid learning, media, and games, enhance learning and participation. These tools convert traditional lessons into amazing and engaging lessons that are appealing to the students and encourage them to learn Houston, R. D., & Erdelez, S. (2004).Research indicates that designing CKBPs that allow student-mediated interaction in terms of quizzes, simulations, and multimedia leads to increased student involvement and knowledge retention. Thereby, making it easier to attain engagement with the academic materials, which has been proven to enhance understanding and

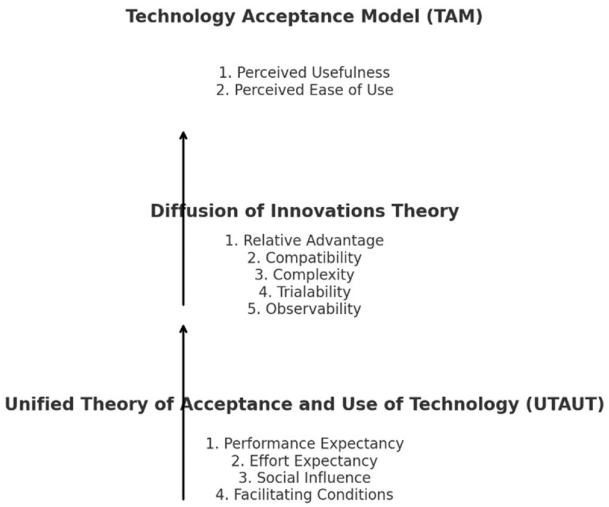
comprehension of material studied Dhiman, V., Bharti, A., & Gaur, G. (2022, June). Modern forms of learning technologies, like learning management systems, messaging applications, and parent interfaces, help deliver effective and coherent communication between the teachers, students, and parents (Johnson et al., 2020). These have created a platform for sharing tasks, peer assessment, and commenting on academic performance, which enhances the group work. Lack of proper communication between the school and the major stakeholders in school engulfs a positive school experience that increases student responsibility and parental participation. E-learning resources make the vast collection of e-books, articles, videos, animated illustrations, computerized models, and simulations available to students and teachers. This access fosters the various learning styles, which helps students in deep learning and thinking Guchinskaya, O., & Kraeva, L. (2017, June). These resources make it easier for the teachers to conduct diversified and diverse lessons and activities that would embrace the multinational students and fit all the knowledge acquisition mode preferences. The use of digital solutions in learning enables students to acquire genuine digital skills and makes them ready to work in a world that is being controlled by technology. However, through the use of the 'digital tools' in their daily learning, the students are able to develop crucial employability skills, including solving problems, working in a team, being communicative, and more importantly, practicing appropriate digital citizenship Tuliakova, K., (2024. Educational technology thus helps students to acquire content knowledge as well as skills relevant for their higher education as well as future employment. Another means through which digital solutions help in cost cutting is through the savings in pull factors such as paper, textbooks, and storerooms. It was revealed that schools that implemented e-books, digital tests, and online communication applications could reduce operating costs; environmental protection can be pillars of cost-saving Kassab, M., DeFranco, J., & Laplante, P. (2020). Such an approach and, at the same time, such costs are quite reasonable with regard to available funds and represent the benefits of digital tools for educational institutions. Technology applications in education have many advantages, ranging from improvements to administrative procedures to targeted learning and interest. These tools help to enhance school management as well as create a more extended and valuable learning process, communication, and students' employment in the future. As more schools embrace advancement in technology, the aforesaid advantages will enhance the education process, effectiveness, interaction, and sustainability. Ellermeijer, T., & Tran, T. B. (2019).

Challenges in Technology Adoption:

However, the main advantage of digital solutions in education is that, even though the implementation of technology in schools is fraught with many problems that can be encountered when trying to successfully use technology in schools, Some of these challenges include budget constraints, poor facilities, lack of teacher training, issues to do with data privacy, and culture resistance. Ejiaku, S. A. (2014). It is essential to overcome these challenges in order to assure that educational institutions can reach the potential of technology-enhanced learning. The major problem that seems to arise when implementing the use of educational technology is the cost factor. Purchasing equipment, enhancing communications, keeping programs updated, and offering continual technological assistance often involves significant expenditures, which few schools can afford Doss, C. R. (2006). Due to constraints in the funds, it is established that technology is not evenly implemented within a school system, and there

is inequality in funding between a rich school and a poor school that may not even afford to stock up on the current technology (Johnson et al., 2020). Effective technology use can by no means happen in schools if reliable support infrastructures are not put in place. However, many educational institutions do not have the broadband connection and the equipment and technical staff to enable the digital learning, as pointed out by Al-Emran, (2023).Lack of adequate infrastructure means that the students and the teachers get interrupted very often, rendering the digital tools less effective. Secondly, stagnated devices and networks compromise the user's patience due to the prolonged time taken before acquiring the newer, improved technologies. This is because teachers have a central role in the use of technologies, and they often get very little training about how to use technology properly in the classroom Shaikh, D. A. A., Kumar, M. A., Syed, D (2021). Such inadequate training can lead to insufficient exploitation of the available technology since the teachers are not fully informed of the opportunity that technology offers. Continuing education courses for teachers should therefore provide training in the use of these technologies and build the teacher's confidence in their own use A. A., & Shaikh, M. Z. (2021). Since schools in the recent past have turned to the use of computers to store important information, data security and privacy have emerged as major concerns. Current principles of curriculum and instruction require schools to shield students' identifiable data from exposure and cyber risks Mustafa, H. K., & Yaakub, S. (2018).But many institutions are too small or inexperienced to adopt appropriate measures of protection that would prevent hackers from stealing valuable information. Another issue is that privacy concerns hinder the complete adoption of digital utilities by parents and educators. Introducing change always calls for a change of culture, which may face opposition from educators, administrators, or learners. Certain instructors might resist change and refuse to modify their ordinary practices since they may find that incorporating new tools to learning makes some tasks even more complicated Koru, G., Alhuwail, D., Topaz, M., Norcio, (2016).Resistance may be due to inexperience in handling technology and/or concern about deterioration of teaching standards. Overcoming such attitudes requires consistent encouragement and implementation of change in order to establish productive innovation in schools. One of the greatest concerns when attempting to provide equity for all students is addressing homework gaps, especially for students with low SES who may not have access to personal devices or internet connectivity at home Batubara, F. R., Ubacht, J., & Janssen, M. (2018, May). Digital equity is needed for all learners to have equal access to learning, while the attainment of the same constitutes a challenge that can only be met through proper policies and financial resources for supporting such equity. Accessibility includes the rights of disabled students and requires the use of specialized tools and software, which, as a rule, are expensive. The use of technology in schools has multiple contingencies: difficulty funding, lack of infrastructure, limited professional development, privacy, organizational resistance, and community access. Toufaily, E., Zalan, T., & Dhaou, S. B. (2021).Addressing these issues calls for integration of adequate peculiarities such as the development of physical structures, extensive professional continuing education of faculty, strong measures on security, that is, cyberspace, and policies and provisions for digital inclusion.

Figure No.01: Theoretical Framework for Technology Adoption



Methodology

Research Design:

This research adopts an explanatory mixed-method research design to assess technology implementation in school management. The quantitative part consists of online questionnaires, which were sent to 50 schools with the participants being administrators, teachers, and IT personnel with regards to their opinions on management software. Major aspects that are considered in the evaluation include perceived organizational impact, perceived ease of use, perceived costs, and perceived difficulties of the technology. The qualitative aspect involves the use of telephone questionnaires and follow-up semi-structured interviews to gain richer data on experiences and observation on technology uptake. Balancing these approaches, this multiple-level strategy seeks to demonstrate how technology can underpin school improvement, as well as elucidating on hurdles to the effective realization of such an ambition, such as cost and organizational inertia.

Data Collection

The method of data collection is an essential step in the research process as it entails gathering information to provide answers to questions and to address objectives of the study. Quantitative and qualitative research techniques are employed in the study titled “Harnessing Technology for Efficient School Management." The sample size of question is 450 from different perspective. Regarding data collection, for the quantitative data, an online questionnaire was used targeting school administrators, teachers, and IT personnel from fifty schools that have integrated technology in their management systems. Some of the questions asked in the surveys included perceived efficiency, usability, costs, and barriers of the technology. Telephone questionnaires and other semi-structured interviews were developed for the qualitative data as they sought to understand the detailed experiences and issues of participants about implementing technologies. This approach provides a broad perspective on how technology

impacts the operational management of schools, including the opportunities and challenges of implementing technology.

Data Analysis :

The quantitative research aspect of the study titled "Harnessing Technology for Efficient School Management" involves data analysis and interpretation of the data collected from surveys and interviews using the statistical tool known as SPSS in order to maintain an aura of objectivity with the data collected. First, survey data will be inputted to SPSS, where basic measurement items like perceived effectiveness, ease of use, and cost be defined. Then descriptive statistics will be worked out, and this will involve working out the frequency distribution table for categorical data and measures of central tendency such as means median and mode for continuous data in order to summarize the ratings and variability in the measurement through dispersion. After this, the inferential statistics will function to correlate variables, compare the satisfaction levels between groups by employing a simple t-test or between multiple groups by employing an ANOVA, and carry out multiple regression analysis to forecast the results. While SPSS mostly deals with numerical data, interviews will be subjected to thematic analysis to reveal the implementation risk and gains in information technology. The findings presented in the form of tables and graphs, with the subsequent discussion that focus on such factors as the research questions. The appendix contains quantitative analysis using the SPSS output in terms of methods, findings, and methods of interpretation, which will lead to addressing the barriers as well as improving technologies in schools recommendations. By adopting this structured format, the study's objectives are to provide a quantitative assessment of the efficiency of technologies in school management to establish the benefits of the technology and the issues encountered by institutions offering education.

Results

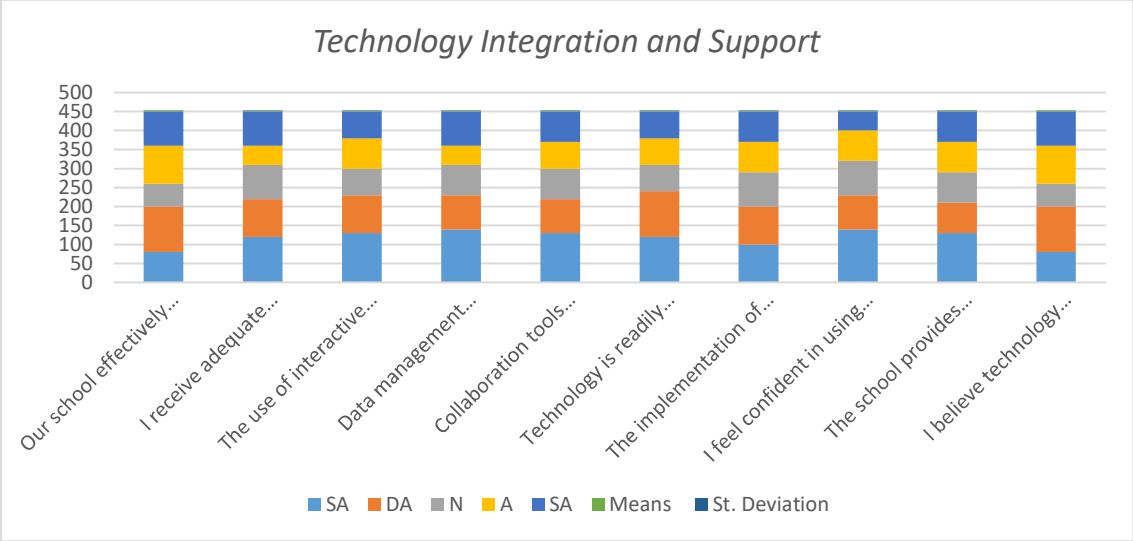
Table No. 01: Demographic Information

Demographic Category	Subcategory	Number of Participants	Percentage
Participant Roles	School Administrators	135	30%
	Teachers	225	50%
	IT Personnel	90	20%
Age Groups	20-30 years	113	25%
	31-40 years	158	35%
	41-50 years	113	25%
	51 years and above	68	15%
Gender	Male	248	55%
	Female	202	45%
Education Level	Bachelor's Degree	270	60%
	Master's Degree	135	30%
	Ph.D. or equivalent	45	10%
Years of Experience in Education	Less than 5 years	90	20%
	5-10 years	135	30%

	11-20 years	158	35%
	Over 20 years	68	15%
School Type	Primary Schools	180	40%
	Secondary Schools	180	40%
	Vocational/Technical Schools	90	20%
Region	Urban	270	60%
	Suburban	113	25%
	Rural	68	15%

Table No.02:Technology Integration and Support

Statement	SA	DA	N	A	SA	Means	St. Deviation
Our school effectively integrates technology into the learning environment.	80	120	60	100	90	3.0000	1.41579
I receive adequate training and support for using technology in my teaching.	120	100	90	50	90	2.7556	1.46459
The use of interactive platforms enhances student engagement in my classes.	130	100	70	80	70	2.7578	1.48234
Data management systems in our school help in tracking student performance efficiently.	140	90	80	50	90	2.7333	1.55665
Collaboration tools improve communication among teachers, students, and parents.	130	90	80	70	80	2.7778	1.47570
Technology is readily available for both teachers and students in our school.	120	120	70	70	70	2.6444	1.40244
The implementation of technology is aligned with our school's educational goals.	100	100	90	80	80	2.8667	1.40948
I feel confident in using technology for educational purposes in my classroom.	140	90	90	80	50	2.5778	1.37572
The school provides sufficient resources for integrating technology into the curriculum.	130	80	80	80	80	2.7556	1.44930
I believe technology enhances the overall learning experience for students.	80	120	60	100	90	3.0022	1.41814

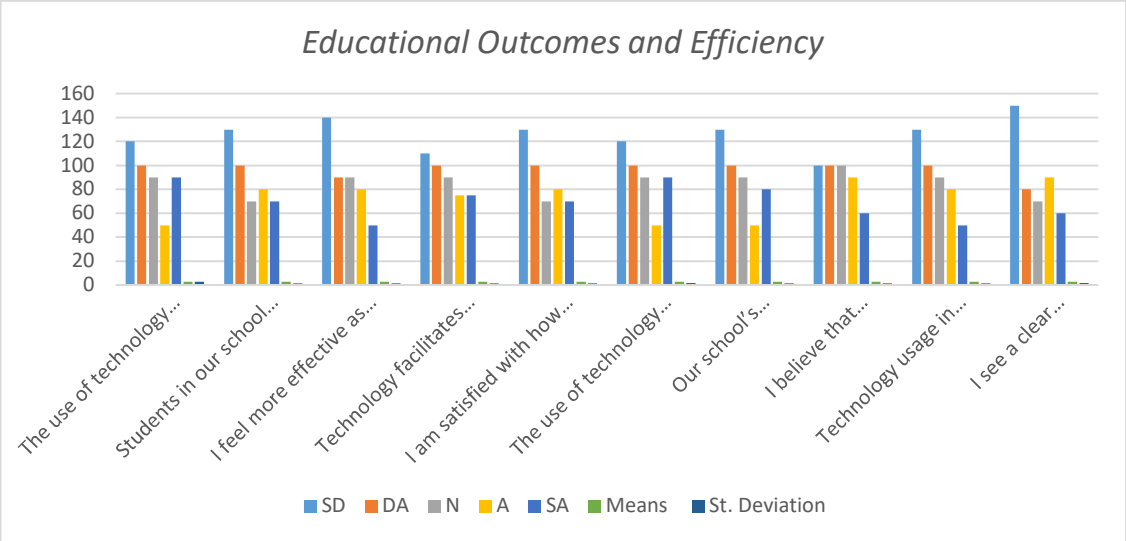


The survey results reveal a generally moderate agreement among participants on the role of technology in enhancing school management and the learning environment, with varying experiences and perceptions across specific areas. Respondents were neutral about the overall effectiveness of technology integration (M = 3.00, SD = 1.42) and whether technology enhances the learning experience for students (M = 3.00, SD = 1.42), indicating mixed views. Slight agreement emerged regarding training support (M = 2.76, SD = 1.46), interactive platforms for student engagement (M = 2.76, SD = 1.48), and data management efficiency (M = 2.73, SD = 1.56), though higher standard deviations here suggest diverse experiences. Participants generally agreed that technology is available (M = 2.64, SD = 1.40) and aligns with school goals (M = 2.87, SD = 1.41). Confidence in using technology for educational purposes was relatively high (M = 2.58, SD = 1.38), indicating comfort among staff, despite some variation. These results suggest that while there is appreciation for technology's role in supporting school management and collaboration, there are notable areas for improvement in terms of resource sufficiency, accessibility, and alignment with educational objectives.

Table No.03:Educational Outcomes and Efficiency

Statement	SD	DA	N	A	SA	Means	St. Deviation
The use of technology has improved the efficiency of administrative tasks in our school.	120	100	90	50	90	2.8644	2.86393
Students in our school perform better academically due to the use of technology.	130	100	70	80	70	2.7333	1.43764
I feel more effective as a teacher because of the technology available to me.	140	90	90	80	50	2.6000	1.35798
Technology facilitates better communication and involvement from parents in school activities.	110	100	90	75	75	2.7889	1.41181
I am satisfied with how technology has been implemented in our school management.	130	100	70	80	70	2.6889	1.44417

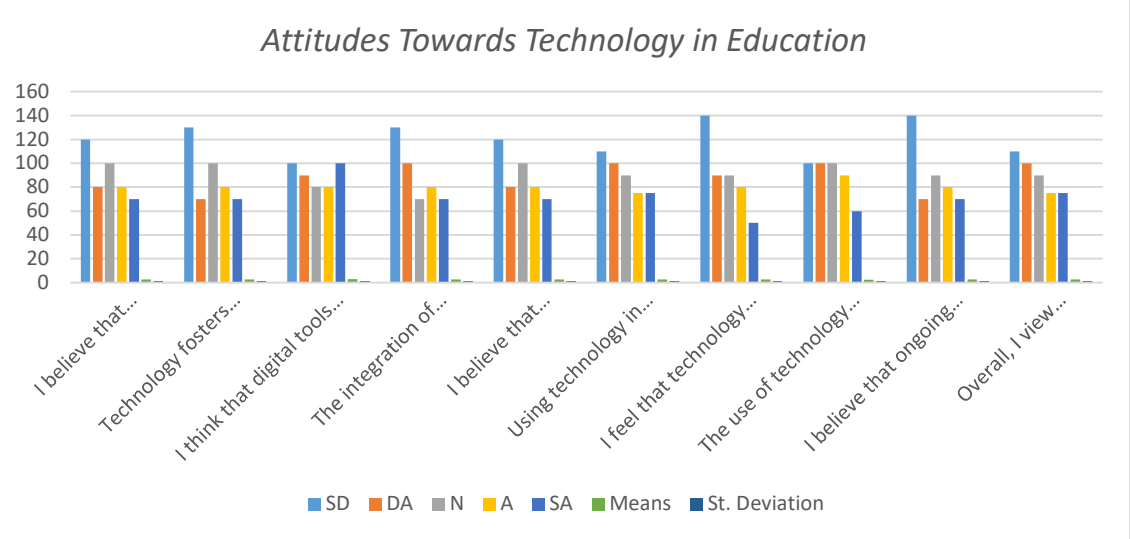
The use of technology has positively influenced student behavior and motivation.	120	100	90	50	90	2.7556	1.46459
Our school's technological resources contribute to a more collaborative learning environment.	130	100	90	50	80	2.6444	1.41823
I believe that technology has made it easier to personalize learning for students.	100	100	100	90	60	2.8000	1.34479
Technology usage in our school has led to higher rates of student attendance.	130	100	90	80	50	2.6000	1.35798
I see a clear connection between technology use and improved educational outcomes for students.	150	80	70	90	60	2.6222	1.45135



From the results of the survey, a positive attitude towards the use of technology to improve education and administrative outcome is suggested, however, responses differ with the specific statements. Participants reported moderate level of agreement with the statement that technology enhances administrative tasks (M = 2.86, SD = 2.86) and supports collaboration in learning (M = 2.64, SD = 1.42). They had a mild expectation of enhanced academic performances with technology (Mean = 2.73, Standard Deviation = 1.44), and the effectiveness of teachers (Mean = 2.60, SD = 1.36) and ORDER NOW students (Mean = 2.76, SD = 1.46). The participants are aware of the impact of technology on communication with parents (M = 2.79, SD = 1.41), and personalized learning (M = 2.80, SD = 1.34) though it is still an area that could be improved. There is a slight positive trend, which indicates that technology is considered advantageous, but there is variability, which points to possible directions for enhancing technology to be adopted in the management of schools and as learning tools.

Table No.04:Attitudes Towards Technology in Education

Statement	SD	DA	N	A	SA	Means	St. Deviation
I believe that technology plays a crucial role in modernizing education.	120	80	100	80	70	2.7778	1.41404
Technology fosters innovation in teaching and learning practices.	130	70	100	80	70	2.7556	1.43385
I think that digital tools can enhance critical thinking skills in students.	100	90	80	80	100	2.9778	1.46965
The integration of technology prepares students for future careers.	130	100	70	80	70	2.6889	1.44417
I believe that technology can bridge educational gaps among students.	120	80	100	80	70	2.7778	1.41404
Using technology in education helps to accommodate diverse learning styles.	110	100	90	75	75	2.7867	1.41384
I feel that technology can create a more inclusive learning environment.	140	90	90	80	50	2.7889	1.41181
The use of technology in education encourages collaboration among students.	100	100	100	90	60	2.4867	1.34514
I believe that ongoing technological advancements will continue to improve educational outcomes.	140	70	90	80	70	2.8022	1.34760
Overall, I view technology as a positive influence on the educational process.	110	100	90	75	75	2.7111	1.45645



The Attitude Analysis section reveals that participants' perceptions of technology are, on average, positive, but variability is observed in certain statements. Table 3 revealed that the respondents had a slightly positive attitude towards the view that technology can significantly enhance the current processes of education modernization (M = 2.78, SD = 1.41) and contribute to innovative development in the field of education (M = 2.76, SD = 1.43). Technology was considered slightly useful in developing critical thinking skills (M = 2.98, SD = 1.47) as well as readiness for career (M = 2.69, SD = 1.44) but was deemed useful in addressing learning style differences (M = 2.79, SD = 1.41) and promoting diversity (M = 2.79, SD = 1.41). A higher degree of consensus was observed regarding the use of technology in enhancing collaboration among students (M = 2.49, SD = 1.35) followed by the perceived effectiveness of technology in overcoming the identified gaps (M = 2.78, SD = 1.41). Specifically, the results indicate the positive attitude of students toward technology as one of the significant factors shaping education; however, varying perceptions indicate that technology could be even more efficient to meet various educational requirements if it is supported and developed continuously.

Table No.05:Regression Analysis:

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	891.541	1	891.541	12134.227	.000b
	32.916	448	0.073		
	924.457	449			

a. Dependent Variable: Educational Outcomes and Efficiency

b. Predictors: (Constant), Technology Integration and Support

In order to analyze the technology integration and support in relation to the educational outcomes and efficiency, a simple linear regression was completed, with the predictor being technology integration and support and the dependent variable being educational outcomes and efficiency. The findings of the regression analysis showed that technology integration and support had a significant relationship with educational outcomes and efficiency. F (1,, 448) = 12134.23, p <. 001 F(1,448)=12134.23,p<.001. The value of the sum of squares for regression was 891.54, while the mean square for this model was calculated to be 891.54, indicating that the predictor variable explains a reasonably large proportion of variance in educational outcomes. The remaining sum of squares of 32.92 indicates that other variables outside the model may account for variation in educational outcomes and efficiency.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
Technology Integration and Support	-0.052	0.028		-1.861	0.063
	0.991	0.009	0.982	110.155	0.000

a. Dependent Variable: Educational Outcomes and Efficiency

This regression analysis tested the hypothesis between the technological variable, technology

integration and support, and the dependent variable, educational outcomes and efficiency. The other quantity is the unstandardized coefficient (B = − 0.052 B=−0.052, SE = 0.028 SE=0.028, t = − 1.86 t=−1.86, p = 0.063 p=0.063) for Technology Integration and Support as one of the predictor variables, therefore indicating that this particular sub-area of the predictor variable did not significantly influence the educational results within the framework of this or that model. However, another element of technology integration and support provided a highly significant degree (B = 0.991 B=0.991, SE = 0.009 SE=0.009, β = 0.982 β=0.982, t = 110.16 t=110.16, p <. 001 p<.001). This large positive standardized coefficient does well support the hypothesis that decision-makers with stronger image manipulation skills have better ability for decision-making. β = 0.982 HO4 Technology integration and support (β= 0.982, p<0.005) supports the hypothesis that Technology Integration and Support strongly positively affects Educational Outcomes and Efficiency. The outcomes presented here indicate that, all in all, technology support and incorporation have a generally positive influence on students' learning success while, possibly within this variable, some constituents are more effective than others.

Table No.05: Discriminate Validity

	Gender	Age of respondent	TIS	EOE	ATTE
Gender	1				
Age of respondent	.754**	1			
Technology Integration and Support	.884**	.927**	1		
Educational Outcomes and Efficiency	.863**	.913**	.982**	1	
Attitudes Towards Technology in Education	.866**	.926**	.994**	.982**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis was used to analyze the existing relationship between gender, age, technology integration and support (TIS), educational outcomes and efficiency (EOE), and attitudes towards technology in education (ATTE). These findings have been depicted in Table 5 below. In table 3, the correlation matrix presented the correlation coefficient between all variables, and all reached the level of.01 (p<.01). The correlation analysis showed that gender had a medium-high relationship with age (t = 9.845, p <. 01, r =.754). The Pearson coefficients of gender and TIS equaled.884, p <.01; EOE.863, p <.01; and ATTE.866, p <.01, which indicated that gender is positively related to these factors. Age indicated a very highly significant positive relationship with TIS, EOE, and ATTE coefficients of.927,.913, and.926, respectively. This means that the level of positive attitude towards TIS, EOE, and ATTE improves as age progresses. When it came to the correlations between TIS and EOE and between TIS and ATTE, two perfect positive correlations were shown with a coefficient of.982, p <.01, and.994, p <.01, respectively. Similarly, it was found that the positive relationship between EOE and ATTE is strongly positively correlated, where as EOE increases the educational outcome and efficiency, a more positive attitude toward the technology is there (r =.982, p<0.01). Thus, it was revealed that all the studied correlations between the variables are positive and statistically significant, which has indicated the relation between the gender, age, the integration and support by technologies, educational effectiveness, and efficiency, as well

as the attitude toward technologies in learning processes.

Challenges faces by School Management

The social media and technology of communication advance rapidly in many sectors of our society, such as education. When schools have embraced the use of technology for administrative and teaching activities, they are exposed to prospects and threats. This paper aims to discuss the ways in which technology may transform the concept and practice of school management for the better to meet the given issues. It helps complete necessary bureaucratic processes, including enrollment, grading system, and student attendance, among others. The processes above are handled by school management systems thus relieving some burden off the administrative employees. The former has the added advantage of conserving time and reducing mistakes that are related to transcribing data. Moreover, technology enhances interaction between teachers and parents with students. Appropriate applications include school management software where communication is real-time and parents and stakeholders are involved directly in education through such facilities as parent portals and messaging applications. Better communication fosters improved school relationships to ensure that everyone works closely for the benefit of the learners. Further, data analytics becomes applicable in schools in that they may use the results of analysis to make decisions on some issues. These form the basis for resultant education solutions, which are based on the needs of the students and the general improvement in their overall educational performance. Technology assists in the administration of school assets such as financial, infrastructural, and personnel. There is management of financial resources, including budgeting and expenditure, through the financial management software, and management of school facilities through the facility management software. Such effective use of available resources assists schools in the overall management of available funds and at the same time makes sure that any investment made has the greatest effect. Further other online educational promotional forums give the opportunity to educators to improve their skills and knowledge permanently. This availability of training and other facilities contributes to staff development and encourages a process of carrying on learning in schools. With investment in their educators, schools can enhance the standard of their teaching and consequently the learners' performance. Nonetheless, there is an increased introduction of new technologies in the workplace, which must overcome challenges from staff that may be rigid and prefer to stick to the conventional ways of doing things. Such tensions can impede the implementation of new, efficient instruments and strategies, which is why schools' leaders must act as advocates of embracing change. The implementation of change management efforts is required due to the perceived issues and need for acceptance throughout an organization. It was clear that more effort should be directed to providing sufficient training and technical assistance to the staff. Lack of training can lead to unprofessional use of the available tools and technologies by the educators, denying them the much-deserved efficiency that the technological module was supposed to bring to their production. It is important for schools to undertake extensive staff development programs to enable everybody at the school to have the confidence to use technology in all working activities. Further, while top-line direct-human-experience technology yields lasting cost savings, the upfront costs of hardware, software, and incumbent training are often expensive. Schools are expected to work under a budget and defend their spending to the various authorities. It becomes important to manage the available finances wisely to increase the growth and development of required technologies.

Employing the benefits of technology has now come with another concern, which is privacy and security of data. The school operates under the legal requirement and is obliged to ensure compliance with the various policies for protection of such information; hence, it will be concerned with cybersecurity. To enhance the protection of students and staff information, it is central to formulate sound policies and practices in data protection. Finally, accessibility of technology and the internet is an issue that not all students and families can afford. Schools need to focus on these disparities in order to make sure every learner can tap into the technological development; this can mean extra funding. The use of technology in the management process of schools can be seen as a pro-actively efficient way of improving the whole educational process. But school leaders need to be cognizant of the difficulties brought by the use of technology in instructional practices. The research finds that changes in culture, training, cost, security, and equity can help schools meet the challenges posed by the technological revolution of education. In order to ensure the proper interphase of technology, schools should prepare an elaborate technology integration plan to define how technology can be integrated in the training process, the evaluation of the amount of money allocated to the technology exercise, and how to engage the stakeholders in the process. Further, staff development, by attending planned training sessions and workshops, will guarantee that all or most of the staff know how to use the new technologies and appreciate their impacts. Stakeholder participation is necessary; the use of parents, students, and the community to discuss the technology use in schools' implementation fosters participation. In addition, schools have to include physical infrastructure to facilitate the provision of the relevant technological resources that include the Internet and devices for the intended technology implementation. Finally, the ongoing assessment of the effects of technology on management activities in schools establishes growth areas that, in the future, necessitate changes to the strategies implemented. These challenges can be effectively managed if schools tap into digital technology in a way that addresses the following drawbacks to create an efficient learning environment that impacts the future of students.

Finding and Discussion

The study of integrating technology in school management identifies the following important findings, which show how technology influences efficiency, communication, and education. First, the use of a school management system has greatly reduced clerks' workloads. From the results obtained, the school noted that there was reduced time taken on enrollment, attendance, and grading since they were automated. Such a conclusion corresponds to the body of research on the effectiveness of technological solutions in administrative activities. Second, the schools that have used communication platforms described higher parent and student involvement. As a result, the parents were able to get more information through parent portals and private group messaging applications and hence improve the teacher-parent relationship. This discovery underlines the essential topics of communication instruments in maintaining and strengthening community relations. Third, the flexibility of using student performance data has put the school leadership in a position to make rational decisions. When data analysis was used, schools observed a change in identifying needs for intervention and addressing students' needs appropriately. This is corroborated with studies done on our data practices as a requisite for improving learners' educational performance. The technology has brought the management of school resources into reality through the provision of ICT. Education institutions implementing

the financial management software observed improvement in the management of their budget and expenditure, hence enhanced capacity to manage their resources. This finding therefore underlines the importance of technical advancement in improving efficiency in operational tasks such as financial management and resource utilization. the online platforms have ensured that the professionals have access to more professional development. I was able to find that schools that availed participation in online training encouraged, and the staff showed enhanced confidence and competence in the use of technology in the classroom. This finding highlights the implication of continuous professional learning as a key to supporting appropriate use of technology. However, as a result of this new style and focus, schools to experience a number of problems. Some of the challenges accumulated included resistance by staff, lack of training, and overemphasis on data privacy and security. Moreover, issues involving distribution of technology affected students: inequality existed, and it hindered more equal implementation approaches. From these conclusions, one can understand that initiating organizational technological changes in schools is quite challenging. Thus, the study discusses possibilities of how technological advancements can revolutionize school management and, at the same time, shows how it is not without certain difficulties. If administrative efficiency is to be translated into an environment conducive to learning, then communication has to be enhanced. This implies that schools could be able to give more time and resources to instructional activities by offloading some of those tedious and repetitive tasks to assistive technology for student's benefit. Decision-making for and from data remains one of the revolutionary strategies of school management. This availability of data analysis capability enables school administrators to analyze, evaluate performance, and offer targeted solutions for students' requirements. Interestingly, this approach promotes educational results in addition to helping schools to embrace accountability and embrace the culture of improvement. However, the challenges identified above cannot be overemphasized, and the following strategies are proposed to address them. The biggest challenge that organizations face today is resistance to change, which is evident in a number of schools. In addressing this problem, school leaders need to involve their staff in decision-making, especially in staff development plans. It is crucial to work on proper change management, as one of the primary reasons for technology failure is people's resistance. Furthermore, the issue that has always emerged is how equity of technologies is going to be addressed. This paper seeks to establish that schools have the responsibility of providing technological resources for all students irrespective of their tomato class status. This may include collaboration with stakeholders such as local-based organizations, developing infrastructure, or supplying homeworking students with devices. Therefore, on our way to flipping the management of our educational facilities and upgrading School A and B's efficiency and effectiveness to deliver the education our children deserve, we need to consider the challenges. The following areas developed in schools: management of change, training investment, security, and technology equity: By combating poor implementation of change, effective training, data security, and the struggle for fairness, the potential of technology is exhibited entirely so that schools can advance to an effective learning environment.

Conclusion

The use of technology in the management of schools is therefore a new prospect area for getting the best results operationally, in communication as well as academic achievement. The results

clearly show that integrated management systems of schools and the usage of big data can minimize paper work, improve communication between participants, and provide teachers with proper tools to take precise decisions in favor of students. Furthermore, he or she implies the constant training of educators in the usage of such technologies is helpful for the learning atmosphere as well. The road to technology effectiveness is not without some kind of turbulence. The main challenges that school face include resistance to change, issues with training, data privacy, and security, as well as issues with the scale of technology among students. There is a need to involve staff, foster culture change, and provide devices for learning to as many children as possible in schools. In this way, by describing all the above-mentioned challenges and improving the schools' actions regarding these issues, one can embrace all-inclusive benefits that technology can offer in order to design a more efficient and promoting learning process. Given that advancement in technology is inevitable in the future, the expansion of embracing technology in education will be crucial in developing the quality of education to equip students to fit into it. The use of technology in the management of schools is very much not just an aspiration but a mandate towards achieving change for the better in the system of education for the benefit of all stakeholders.

References

1. Abed, E. K. (2019). Electronic learning and its benefits in education. *EURASIA Journal of Mathematics, Science and Technology Education*, *15*(3), em1672.
2. Adada, N., Shatila, A., & Mneymneh, N. M. (2017). Technology leadership: Bridging the gap between problems and solutions in Lebanese schools. In *Comprehensive problem-solving and skill development for next-generation leaders* (pp. 293-312). IGI Global.
3. Adams, S., & Thompson, R. (2018). Virtual laboratories in chemistry education: A systematic review. *Journal of Chemical Education, 95*(11), 1899–1909. DOI: 10.1021/acs.jchemed.8b00218
4. Ahmad, E. A. (2024). Revolutionizing learning: leveraging social media platforms for empowering open educational resources. *International Journal of e-Learning and Higher Education (IJELHE)*, *19*(1), 83-106.
5. Akçayır, G., & Akçayır, M. (2017). Advantages and challenges associated with augmented reality for education: A systematic review of the literature. *Educational Research Review, 20*, 1–11. DOI: 10.1016/j.edurev.2016.11.002
6. Al-Emran, M., & Griffy-Brown, C. (2023). The role of technology adoption in sustainable development: Overview, opportunities, challenges, and future research agendas. *Technology in Society*, *73*, 102240.
7. Alias, N. A., & Zainuddin, A. M. (2005). Innovation for better teaching and learning: Adopting the learning management system. *Malaysian online journal of instructional technology*, *2*(2), 27-40.
8. Avidov-Ungar, O. (2010). " Islands of Innovation" or" comprehensive innovation." Assimilating educational technology in teaching, learning, and management: a case study of school networks in Israel. *Interdisciplinary Journal of E-Learning and Learning Objects*, *6*(1), 259-280.
9. Batubara, F. R., Ubacht, J., & Janssen, M. (2018, May). Challenges of blockchain technology adoption for e-government: a systematic literature review. In *Proceedings*

of the 19th annual international conference on digital government research: governance in the data age (pp. 1-9).

10. Bergdahl, N., Nouri, J., & Fors, U. (2020). Disengagement , engagement and digital skills in technology-enhanced learning Content courtesy of Springer Nature , terms of use apply . Rights reserved . Content courtesy of Springer Nature , terms of use apply . Rights reserved . Education and Information Technologies, 25, 957–983.
11. Chang, I. H., Chin, J. M., & Hsu, C. M. (2008). Teachers' perceptions of the dimensions and implementation of technology leadership of principals in Taiwanese elementary schools. *Journal of Educational Technology & Society*, *11*(4), 229-245.
12. Chen, C. M., & Tsai, Y. N. (2012). Interactive multimedia instruction in online learning environments: A systematic review. *Computers & Education, 59*(2), 603–615. DOI: 10.1016/j.compedu.2012.03.004 Gagnon, K. (2020). Using big data and machine learning in chemistry education: Current trends and future prospects. *Journal of Chemical Education, 97*(12), 4534–4542. DOI: 10.1021/acs.jchemed.0c00522
13. Christensen, R., Eichhorn, K., Prestridge, S., Petko, D., Sligte, H., Baker, R., ... & Knezek, G. (2018). Supporting learning leaders for the effective integration of technology into schools. *Technology, Knowledge and Learning*, *23*, 457-472.
14. Dhiman, V., Bharti, A., & Gaur, G. (2022, June). Benefits of Digital Education Over the Impact of Pandemic on Indian Higher Education System. In *Proceedings of Second International Conference in Mechanical and Energy Technology: ICMET 2021, India* (pp. 295-306). Singapore: Springer Nature Singapore.
15. Doss, C. R. (2006). Analyzing technology adoption using microstudies: limitations, challenges, and opportunities for improvement. *Agricultural economics*, *34*(3), 207-219.
16. Ejiaku, S. A. (2014). Technology adoption: Issues and challenges in information technology adoption in emerging economies. *Journal of International Technology and Information Management*, *23*(2), 5.
17. Ellermeijer, T., & Tran, T. B. (2019). Technology in teaching physics: Benefits, challenges, and solutions. *Upgrading physics education to meet the needs of society*, 35-67.
18. Ferdig, R. E. (2006). Assessing technologies for teaching and learning: understanding the importance of technological pedagogical content knowledge. *British journal of educational technology*, *37*(5), 749-760.
19. Guchinskaya, O., & Kraeva, L. (2017, June). From the E-Learning and Blended-Learning to M-Learning: trends, benefits and risks of education digital transformation. In *Proceedings of the International Conference IMS-2017* (pp. 82-89).
20. Houston, R. D., & Erdelez, S. (2004). The digital divide: Who really benefits from the proposed solutions for closing the gap. *Journal of information ethics*, 19.
21. Hsiao, H. C., Chen, S. C., Chang, J. C., Chou, C. M., & Shen, C. H. (2009). Factors that influence school organizational innovation in technical institutes and universities. *practice*, *15*, 71-76.

22. Johnson, A. M., Jacovina, M. E., Russell, D. G., & Soto, C. M. (2016). Challenges and solutions when using technologies in the classroom. In *Adaptive educational technologies for literacy instruction* (pp. 13-30). Routledge.
23. Kassab, M., DeFranco, J., & Laplante, P. (2020). A systematic literature review on Internet of things in education: Benefits and challenges. *Journal of computer Assisted learning*, *36*(2), 115-127.
24. Koru, G., Alhuwail, D., Topaz, M., Norcio, A. F., & Mills, M. E. (2016). Investigating the challenges and opportunities in home care to facilitate effective information technology adoption. *Journal of the American Medical Directors Association*, *17*(1), 53-58.
25. Makinde, A. I., Adeleye, S. A., Oronti, A. O., & Jimoh, I. T. (2024). Revolutionizing education. *Artificial Intelligence for Wireless Communication Systems: Technology and Applications*, *103*.
26. Mullakhmetov, K. S., Aminova, R. M., & Filimonchuk, I. I. (2019). Administrative Innovations as Necessary Condition of Competitiveness in Schools. *Journal of Educational and Social Research*, *9*(4).
27. Mustafa, H. K., & Yaakub, S. (2018). Innovation and technology adoption challenges: impact on SMEs' company performance. *International Journal of Accounting*, *3*(15), 57-65.
28. Mustar, P. (2009). Technology management education: Innovation and entrepreneurship at MINES ParisTech, a leading French engineering school. *Academy of Management Learning & Education*, *8*(3), 418-425.
29. Ngmenkpieo, F., Tseer, T., & Chirani, F. (2023). The Digital Edge in Education: Harnessing ICT for Optimal School Management. *Politi Sci Int*, *1*(2), 87-96.
30. Ogunode, N. J., & Ndayebom, A. J. (2023). Digitalization of higher education in Nigeria: Benefits, problems and solutions. *Electronic Research Journal of Social Sciences and Humanities*, *5*(2), 31-47.
31. Okon, O. E., & Essien, M. I. (2014). School-based data and management of technological innovations in public secondary schools in Cross River State. *Global Journal of Educational Research*, *13*(2), 73-79.
32. Onesi-Ozigagun, O., Ololade, Y. J., Eyo-Udo, N. L., & Ogundipe, D. O. (2024). Revolutionizing education through AI: a comprehensive review of enhancing learning experiences. *International Journal of Applied Research in Social Sciences*, *6*(4), 589-607.
33. Parveen, D. S., & Ramzan, S. I. (2024). The Role of Digital Technologies in Education: Benefits and Challenges. *Int. Res. J. Adv. Eng. Manag*, *2*, 2029-2037.
34. Pratama, M. P., Al-gifari, M. K. G., & Pertiwi, A. (2022). Aplikasi Notifikasi Tagihan Penggunaan Air Pelanggan PDAM Kota Makassar Berbasis SMS Gateway Menggunakan Metode FIFO (First In First Out). Patria Artha Technological Journal, 6(2), 168–173.
35. Renz, A., & Vladova, G. (2021). Reinvigorating the Discourse on Human Centered Artificial Intelligence in Educational Technologies. 11(5).
36. Schilling, M. A. (2017). *Strategic management of technological innovation*. McGraw-Hill.

37. Shaikh, D. A. A., Kumar, M. A., Syed, D. A. A., & Shaikh, M. Z. (2021). A two-decade literature review on challenges faced by SMEs in technology adoption. *Academy of Marketing Studies Journal*, *25*(3).=
38. Shaikh, D. A. A., Kumar, M. A., Syed, D. A. A., & Shaikh, M. Z. (2021). A two-decade literature review on challenges faced by SMEs in technology adoption. *Academy of Marketing Studies Journal*, *25*(3).
39. Shane, S. A., & Ulrich, K. T. (2004). 50th anniversary article: Technological innovation, product development, and entrepreneurship in management science. *Management science*, *50*(2), 133-144.
40. Shohel, M. M. C., & Kirkwood, A. (2012). Using technology for enhancing teaching and learning in Bangladesh: challenges and consequences. Learning, Media and Technology, 37(4), 414–428.
41. Shrivastava, P., & Souder, W. E. (1987). The strategic management of technological innovations: A review and a model. *Journal of Management Studies*, *24*(1), 25-41.
42. Suciati, S., Faridi, A., Mujiyanto, J., & Arifani, Y. (2021). Artificial Intelligence Application dalam Pembelajaran Speaking : Persepsi dan Solusi. 1111–1115.
43. Tariq, R., Casillas-Muñoz, F., Hassan, S., & Ramírez-Montoya, M. (2024). Synergy of Internet of Things and education: Cyber-physical systems contributing towards remote laboratories, improved learning, and school management. *Journal of Social Studies Education Research*, *15*(2), 305-352.
44. Toufaily, E., Zalan, T., & Dhaou, S. B. (2021). A framework of blockchain technology adoption: An investigation of challenges and expected value. *Information & Management*, *58*(3), 103444.
45. Tuliakova, K., Medvedchuk, A., & Petrenko, M. (2024). Digital inclusion in education: challenges and benefits. *Digital inclusion in English language teaching*, 53.
46. Wang, F., & Reeves, T. C. (2003). Why do teachers need to use technology in their classrooms? Issues, problems, and solutions. *Computers in the Schools*, *20*(4), 49-65.
47. Zalte, S. M. (2023). Revolutionizing education: leveraging ai-ml technologies to enhance teaching and learning outcomes. 12(12), https://doi.org/10.48047/ecb/2023.12.si12.058
48. Василишина, Н. М. (2020). Benefits of digital learning application at universities. *Вісник Житомирського Державного Університету Імені Івана Франка. Педагогічні Науки*, (103), 61-68.